

Table Tennis Training Using 3D Motion Sensors

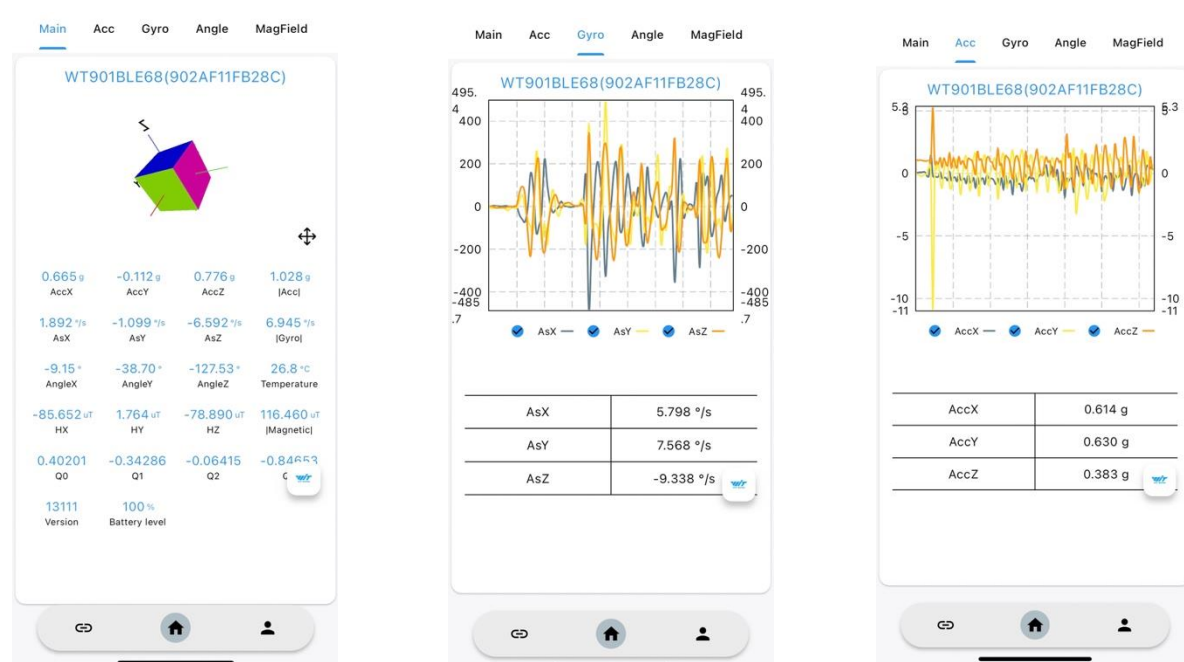
Amber Liu

Motivation

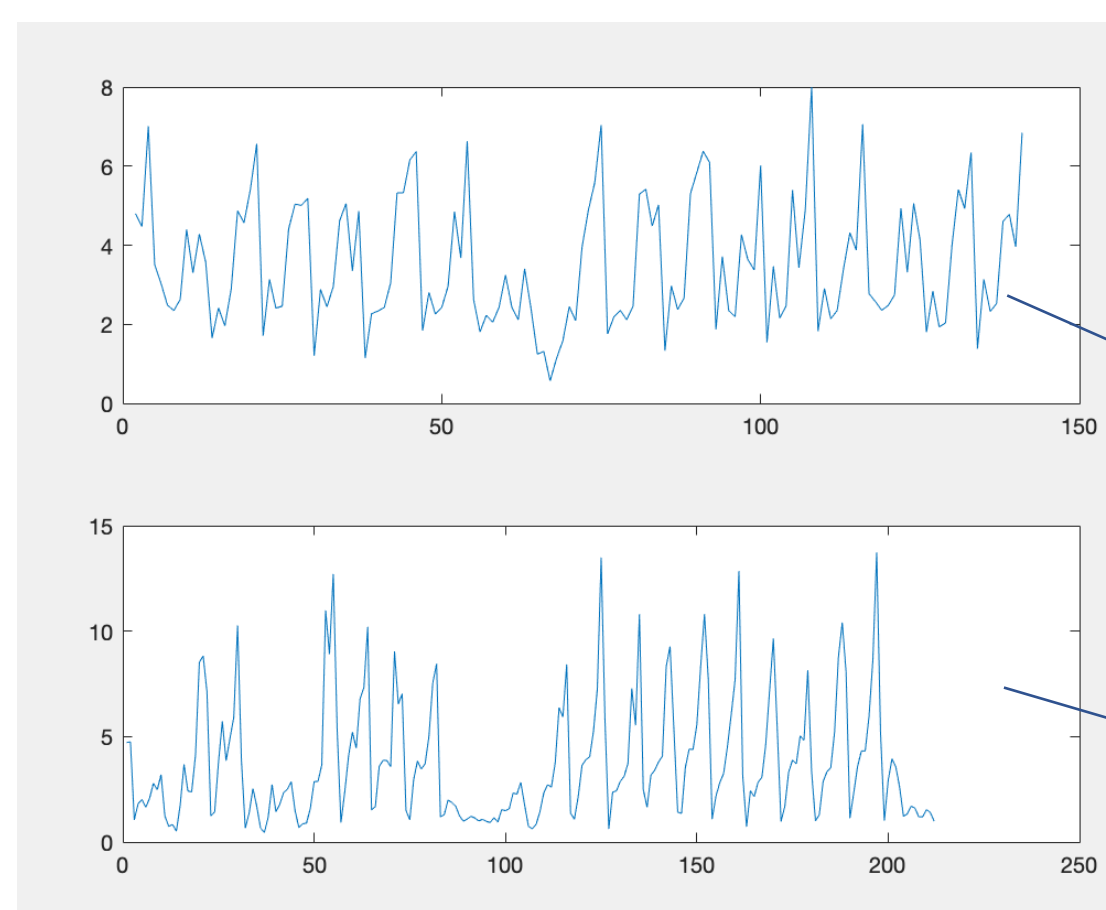
- ❖ Sports training is repeated
- ❖ During training, trainee requires coaches to justify whether the athletes were doing the right movements during a drill.
- ❖ The training efficiency highly depends on the coach's observation and communications between trainer and trainee.
- ❖ Some sports (e.g., swimming, jumping) have started using high technique to enhance the training process

Project description

- ❖ Put the sensor on the wrist or ankle
- ❖ Collect data while training
 - ❖ 3D accelerations
 - ❖ 3D gyroscope data



- ❖ From acceleration to analyze the force and the direction of the movements
- ❖ Example



Trainee's forehand

Trainer's forehand

- The forces from the trainer and trainee are plotted from the data
- Coach's forehand is much more consistent in terms force and direction
- Comparing the data

Problem Statement

- ❖ Table tennis training highly relies on coach's verbal communications
- ❖ The existing video-based techniques cannot tell the physical conditions
- ❖ Long time repeated training may cause body chronical injury
- ❖ 3D motion sensors on the arm and ankle can facilitate monitoring the physical motions

Bio

- Amber Liu is a junior at Johns Creek High School
- Four consecutive years Team USA National Youth Table Tennis member
- Two times national champions
- Represented USA to compete
 - Three times Pan America with 5 gold medals, Ecuador, USA, Peru, 2021, 2023, 2024
 - World Youth Table Tennis championships, Slovenia 2023
 - World Team Table Tennis Championships, Korea 2024
 - World Table Tennis Youth Contender 2023, 2024

